

What Is Claimed Is:

1. A data restoring method for restoring data stored in a second storage system in a storage subsystem including a first storage system and a second storage system, each of which is
5 connected to a host via a communication channel, in which the second storage system stores a copy of data to be transmitted from the first storage system, wherein

the first storage system processes an I/O request from
10 the host, and as a result of I/O processing of the second storage system, transmits updated data,

the second storage system retains data received from the first storage system as update log data, and

the host transmits a command for settling a state of an
15 application to the first storage system as data, the first storage system transmits the data to the second storage system, and the host and the second storage system both retain an identifier corresponding to the command, and relate the identifier to the log data whereby the host designates the
20 identifier at any given time to thereby restore data at any given time by the second storage system.

2. The data restoring method according to Claim 1, wherein the host issues an I/O instruction of an identifier to the second storage system at a remote site.

25 3. The data restoring method according to Claim 1, wherein

the second storage system at a remote site receives the I/O instruction of an identifier of the host, and relates the update log of data to the identifier to store it in a storage unit.

4. The data restoring method according to Claim 1, wherein
5 if when restoring data stored in the second storage system to its original state, an identifier which coincides with the identifier which has been transmitted from the host and received is retrieved and the target identifier is searched for, the data is restored in a source storage unit to its original state
10 through the use of data stored in a target storage unit and content of the log data recorded prior to the log data related to the coincided identifier.

5. The data restoring method according to Claim 1, wherein
on receipt of an acquisition commencement command of log data
15 and a command for suspending pair duplex of the storage unit from the host, the first storage system confirms a storage unit located in the second storage system which is in the pair duplex to suspend the pair duplex.

6. The data restoring method according to Claim 1, wherein
20 on receipt of a mark command issued by the host, the second storage system confirms a storage unit which acquires the log data, and sets correspondence of the mark ID and mark data including a timer value to the log data acquired.

7. A data processing method for processing data to be
25 stored in a storage unit in a computer system including a storage

system equipped with the storage unit connected to a host through a network, wherein the host comprises the steps of:

requesting the storage system to create and save a copy of data which has been stored in the storage unit;

5 requesting the storage system to record an update portion of data due to processing of the host; and

transmitting to the storage system identification information for identifying a state of the computer system at any given time, and

10 the storage system comprises the steps of:

creating and saving a copy of data of the storage unit in response to a request of the host;

saving, when content of the storage unit has been updated, data prior to and subsequent to the update and information
15 indicating a place of update as log data;

retaining identification information to be transmitted from the host; and

relating the log data to the identification information.

8. The data processing method according to Claim 7, wherein
20 when storing the content stored in the storage unit to a state at any given time, the host designates state identification information to transmit a request for restoring the data to the storage system, and

the storage system discriminates the identification
25 information received and restores the data through the use of

a copy of the data and the log data.

9. The data processing method according to Claim 8, wherein the identification information that the host and the storage system have in common is managed by the storage system by relating
5 the identification information to update history, and data stored in the storage unit up to update history indicated by specific identification information is restored in response to an instruction from the host.

10. The data processing method according to Claim 8,
10 wherein the log data includes at least an entry for a mark flag indicating whether or not it is specific identification information, an entry for identification information of a log, an entry for a timer value indicating a time period during which the log has been acquired, and an entry which becomes a data
15 area, and

when the mark flag indicates the specific identification information, the entry of the data area is defined as at least an entry of mark identification information and an entry for a timer value indicating a time period during which the mark
20 has been imparted.

11. The data processing method according to Claim 10, wherein on executing a program, when a file is closed, or when the file is saved, the host generates a specific command for relating the log data to the identification information to
25 transmit it to the storage system, and the storage system

executes the command, sets the mark flag to a specific state, and retains, in the storage unit, log data in which mark identification information and time values have been stored in the entry.

5 12. A storage subsystem including a first storage system and a second storage system, each of which is connected to a host via a communication channel, for storing, in the second storage system, a copy of data stored in the first storage system,

the first storage system comprising:

10 a storage unit having a plurality of logical storage units;

a cache memory for temporarily storing data to be inputted into or outputted from the storage unit;

a memory for storing at least management information concerning the logical storage unit, management information
15 for defining a configuration of pair duplex between the first storage system and the second storage system and a program for processing a command from the host; and

a processor for executing the program,

the second storage system comprising:

20 a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit comprises: a storage unit to be allocated in order to store log data generated by
25 the first storage system; a cache memory for temporarily storing

data to be inputted into or outputted from the storage unit;
a memory for storing at least management information concerning
the logical storage unit, management information for defining
a configuration of pair duplex between the first storage system
5 and the second storage system, management information of a log
and a program for processing a command from the host; and a
processor for executing the program, wherein

when content of a certain logical storage unit of the
first storage system has been updated, the data thus updated
10 and information indicating a place of update are transmitted
to the second storage system as log data and stored in the logical
storage unit, and management information for bringing
identification information transmitted from the host into
correspondence with the log data is stored in the memory.

15 13. The data storage subsystem according to Claim 12,
wherein when the log data stored in the logical storage unit
in the second storage system is restored to a state at any given
time, the second storage system receives a request for restoring
data transmitted from the host, and restores the log data stored
20 in the logical storage unit by referring to the management
information stored in the memory concerning the identification
information.

14. The data storage subsystem according to Claim 12,
wherein the memory of the first storage system and the memory
25 of the second storage system have:

a storage management information table for registering correspondence between an address of the storage unit which the host is capable of identifying and a logical address within the storage unit;

5 a storage management information table for registering correspondence among a logical address within the storage unit, an address concerning a RAID group in which the logical storage unit has been arranged, and an address concerning a disk for forming the RAID group;

10 a volume configuration information table for registering volume configuration information correspondingly to a number of the logical storage unit; and

a pair management information table for registering correspondence between a number of the logical storage unit
15 within the first storage system for constituting a pair and a number of the logical storage unit within the second storage system.

15 The data storage subsystem according to Claim 14, wherein at least the second storage system has:

20 a log volume group information table which registers management information concerning a logical storage unit within the log volume group for each log volume group;

a log ID management information table for bringing a log ID to be imparted when the log data is stored in the logical
25 storage unit into correspondence to a timer value when the log

data has been acquired to register as management information;
and

a mark ID management information table for bringing
identification information to be imparted when the log data
5 is stored in the logical storage unit, which has been transmitted
from the host, into correspondence to a timer value when the
log data is stored to register as management information.

16. The data storage subsystem according to Claim 12,
wherein in the first storage system, the command processing
10 program processes a command to be transmitted from the host,
and when the command is a mark command, creates log data and
performs processing for imparting the identification
information, and

in the case of an I/O processing command, the command
15 processing program determines a hit or a miss-hit of the cache
memory, writes write data in the cache memory, or reads out
read data from the cache memory.

17. The data storage subsystem according to Claim 12,
wherein on receipt of the mark command issued by the host, the
20 second storage system confirms a storage unit which acquires
the log data, and sets correspondence between the log data thus
acquired and mark ID and mark data including timer values.

18. A storage system for storing, in a second storage
system, a copy of data to be stored in a first storage system
25 to be connected to a host via a communication channel, having:

a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit comprises: a storage
5 unit to be allocated in order to store log data generated by the first storage system; a cache memory for temporarily storing data to be inputted into or outputted from the storage unit; a memory for storing at least management information concerning the logical storage unit, management information for defining
10 a configuration of pair duplex between the first storage system and the second storage system, management information of a log and a program for processing a command from the host; and a processor for executing the program, wherein

when content of a certain logical storage unit of the
15 first storage system has been updated, the data thus updated and information indicating a place of update are transmitted to the second storage system as log data and stored in the logical storage unit, and management information for bringing
identification information transmitted from the host into
20 correspondence with the log data is stored in the memory.

19. The storage system according to Claim 18, wherein
when the log data stored in the logical storage unit is restored
to a state at any given time, the second storage system receives
a request for restoring data transmitted from the host, and
25 restores the log data stored in the logical storage unit by

referring to the management information stored in the memory concerning the identification information.

20. A storage subsystem including a first storage system and a second storage system, each of which is connected to a host via a communication channel, for storing, in the second storage system, a copy of data stored in the first storage system,

the first storage system comprising:

a storage unit having a plurality of logical storage units;

a cache memory for temporarily storing data to be inputted into or outputted from the storage unit;

a memory for storing at least management information concerning the logical storage unit, management information for defining a configuration of pair duplex between the first storage system and the second storage system and a program for processing a command from the host; and

a processor for executing the program, wherein

the command processing program processes a command to be transmitted from the host, and when the command is a mark command, creates log data and performs processing for imparting identification information, and

in the case of an I/O processing command, the command processing program determines a hit or a miss-hit of the cache memory, writes write data in the cache memory, or reads out read data from the cache memory,

the second storage system comprising:

a plurality of logical storage units, of which a certain logical storage unit stores a copy of data to be stored in a logical storage unit of the first storage system constituting a pair, and another logical storage unit comprises: a storage
5 unit to be allocated in order to store log data generated by the first storage system; a cache memory for temporarily storing data to be inputted into or outputted from the storage unit; a memory for storing at least management information concerning the logical storage unit, management information for defining
10 a configuration of pair duplex between the first storage system and the second storage system, management information of a log and a program for processing a command from the host; and a processor for executing the program, wherein

when content of a certain logical storage unit of the
15 first storage system has been updated, the data thus updated and information indicating place of update are transmitted to the second storage system as log data and stored in the logical storage unit, and management information for bringing identification information transmitted from the host into
20 correspondence with the log data is stored in the memory,

on receipt of an acquisition commencement command of log data and a command for suspending the pair duplex of the storage unit from the host, the first storage system confirms a storage unit located in the second storage system which is in the pair
25 duplex to suspend the pair duplex,

when the log data stored in the logical storage unit in the second storage system is restored to a state at any given time, the second storage system receives a request for restoring data transmitted from the host, and restores the log data stored

5 in the logical storage unit by referring to the management information stored in the memory concerning the identification information.